2019-2020
Graduate Research Awards
for Disarmament, Arms Control and Non-Proliferation

Results of the 2019-2020 competition

A joint project of:

The Simons Foundation

Global Affairs Canada | Affaires mondiales Canada

Executive Summary

The ***Graduate Research Awards for Disarmament, Arms Control and Non-proliferation*** (GRA) programme was initiated in 2003 by Dr. Jennifer Allen Simons, President of The Simons Foundation Canada, in partnership with the International Security Research and Outreach Programme (ISROP) of Foreign Affairs and International Trade Canada (now Global Affairs Canada). The primary objective of the Awards is to enhance Canadian graduate level scholarship on non-proliferation, arms control and disarmament (NACD) issues.

Since its inception, the Graduate Research Awards programme has provided over $385,000.00 in scholarships to Canadian graduate students working on policy-relevant NACD issues and has helped to encourage a new generation of young Canadian scholars dedicated to further expanding their knowledge and expertise on these critical issues.

Originally, the programme offered three Doctoral Research Awards of $5,000.00 and four Master's Research Awards of $2,500.00 to support research, writing and fieldwork leading to the completion of a major research paper or dissertation proposal on an issue related to disarmament, arms control and non-proliferation.

In order to allow a greater number of students to participate, the GRA competition was later restructured to consist of a series of debates on timely issues. The eight students who made the strongest argument in support of their position, as determined by an expert review panel, were selected to receive a Graduate Research Award of $3,000.00 and required to defend their position in person at the GRA Debates held at the Department of Foreign Affairs headquarters in Ottawa.

The competition has since been revised to simplify the application process and increase the value of the cash awards. A total of four awards of CAD$5,000 are now available to Canadian Master's and/or Doctoral candidates to support the research and writing of an academic paper responding to a specific Non-Proliferation, Arms Control and Disarmament (NACD) topic.

The 2019-2020 Awards also included travel support to Ottawa for a special seminar and luncheon for the Graduate Research Award winners hosted by Global Affairs Canada to provide the next generation of experts in the NACS field a unique opportunity for exchange among officials from Global Affairs Canada's International Security and Political Affairs Branch, including the Non-Proliferation and Disarmament Division and the Defence and Security Relations Division. Due to travel and safety concerns related to the Covid-19 pandemic the 2020 GRA Seminar in Ottawa has been indefinitely postponed until sometime in 2021.

For the 2019-2020 GRA competition, Master's and Doctoral candidates chose to address one of the following subjects:

1. To what degree do you believe Intangible Technology Transfer (ITT) plays a role in today's weapons of mass destruction risk and how could governments more effectively seek to mitigate these risks?

2. In light of the pervasive threat of nuclear terrorism and the corresponding need for strong nuclear security, how can states make sure that nuclear security is enhanced while also ensuring that heightened security doesn't stand as a barrier to States seeking access to peaceful nuclear energy and technology?

3. In 2018, the United Nations launched Youth 2030: Working with and for Young People to support the empowerment, engagement and participation of young people. Priority five of the strategy focuses on supporting young people as catalysts for peace and security. How can Canada engage to further increase and empower youth participation in the non-proliferation, arms control, disarmament, and/or outer space policy-making process?

4. The Brussels Summit Declaration Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Brussels 11-12 July 2018 stated "The Alliance reaffirms its resolve to […] take further practical steps and effective measures to create the conditions for further nuclear disarmament negotiations and the ultimate goal of a world without nuclear weapons […] in an ever more effective and verifiable way that promotes international stability, and is based on the principle of undiminished security for all." What practical steps could NATO Allies consider taking to advance these goals are such actions best pursued within or outside of NATO as an institution?

5. As outer space becomes more contested, congested and competitive, the theme of maintaining peace and security while supporting commercialization is becoming more and more prevalent. What are some practical measures (i.e. legislation, regulations, policies, procedures, multilateral agreements, rules of engagement, etc) that Canada could implement to actively promote peace and security in space that go beyond supporting of international treaties, resolutions and TCBMs?

We are pleased to congratulate the following 2019-2020 Graduate Research Award recipients who each received a cash award of CAD$5,000.00 from The Simons Foundation Canada as well as travel support to Ottawa to participate in the next GRA Seminar when it is rescheduled.

- **Kayla Dinsmore**
  Master's of Arts, Centre for European and Eurasian Studies
  University of Toronto

- **Alexander J. MacDonald**
  Master of Strategic Studies, Centre for Military, Security and Strategic Studies
  University of Calgary

- **John Marshall Palmer**
  Doctor of Philosophy, International Affairs, Norman Paterson School of International Affairs
  Carleton University

- **Laura Pottier**
  Master's of Arts, International Affairs, Norman Paterson School of International Affairs
  Carleton University

We also wish to recognize Tristan G.Garcia, Senior Policy Officer (WMD and Nuclear NACD Policy) at Global Affairs Canada and Elaine Hynes of The Simons Foundation Canada for their work to coordinate and execute the programme this year.

The 2020-2021 Graduate Research Awards competition will be launched in fall 2020.

Disclaimer: The views and positions expressed in this report are solely those of the author and do not necessarily reflect the views of The Simons Foundation or Global Affairs Canada. The report is in its original language.

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Topic: ***As outer space becomes more contested, congested and competitive, the theme of maintaining peace and security while supporting commercialization is becoming more and more prevalent. What are some practical measures (i.e. legislation, regulations, policies, procedures, multilateral agreements, rules of engagement, etc) that Canada could implement to actively promote peace and security in space that go beyond supporting of international treaties, resolutions and TCBMs?***

Kayla Dinsmore
Master's of Arts
Centre for European and Eurasian Studies
University of Toronto

Kayla Dinsmore is a graduate student at the Munk School of Global Affairs. She is completing her Master's degree in European and Russian Affairs, with a focus on intelligence, security, and disarmament/non-proliferation. Kayla is a regional specialist with a concentration on Russia, Ukraine, and other post-soviet states. She is a dual-citizen of the USA and Canada, and lived most of her life in Atlanta, Georgia. She speaks English and Spanish fluently and has some knowledge of Russian and Swahili.

Preventing an Arms Race: Canada and the Preservation of Space

As the use of space for political, economic, and military purposes becomes more common amongst space-faring countries, establishing rules of engagement will be critical in preserving the sanctity of space for all of mankind. I will address some of the current issues surrounding weapons and technology being placed in orbit, and propose a framework of policies, procedures, and rules of engagement that Canada can undertake in order to encourage peace and security in outer space. First, I will discuss the placement of dual-use weapons in orbit, and the need to document, regulate, and possibly restrict these items. Second, I will describe the capabilities of anti-satellite (ASAT) weapons, and their uses for destroying defunct technology in space as weaponry testing, as well as the orbital debris and potential damage they can cause. Next, I will analyze satellites placed in outer space, their uses, and the dangers of destroying and/or threatening to destroy other states' satellites. I will then explore the necessity of regulating commercial activity in space by private entities. Lastly, I will discuss how Canada can assist in the creation and implementation of restrictions on the use of weapons and technology in space, as a neutral space-faring state, in order to encourage and define appropriate uses of space for other nations.

Canada is considered a middle-power space-faring country, meaning that while it has achieved some significant feats in space, it is not in direct strategic competition with the major powers like Russia, China, and the United States. This middle position could be used to broker a multilateral agreement that outlines the regulations and rules of engagement regarding offensive weapons, orbital debris, private entities, and dual-use technology in space. Currently, there are no treaties that strictly ban the use of weapons in outer space, but only ban the placement of and/or testing of "nuclear weapons or any other kinds of weapons of mass destruction" in space or on any celestial bodies (Treaties on Principles" 3). These treaties also do not include kinetic energy weapons. Likewise, the current treaties restrict the use of space for offensive purposes, but much of the technology being deployed in outer space is multipurpose, which can limit the ability to determine the definition of 'offensive' (Johnson-Freese & Burbach, 137).

Russia and China have pushed for agreements under the Proposed Prevention of an Arms Race in Space (PAROS) resolution, submitting drafts in 2008 and 2014 titled Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT)("Space Issues"). Unfortunately, the United States government has emphatically rejected all such agreements, further limiting international disarmament opportunities ("US Project Thor"). The creation of an acceptable multilateral agreement, with legally-binding ramifications, will be critical in preventing an arms race in outer space. Canada, as a middle-power state, could establish a nonpartisan governing body to assist in the implementation of appropriate rules of engagement that both larger and smaller nations would be comfortable adhering to.

The purpose of the placement of technology in space should be clearly defined and regulated. As technology placement in space can be critical to defensive and deterrence capabilities, it would be impossible and unreasonable to prohibit the placement of dual-use technology in orbit. However, distinguishing between the placement of technology in space for the purposes of navigation, communication, and defensive capabilities, and for the purpose of physically engaging targets on Earth, will be an important consideration in the development of a multilateral agreement.

Therefore, I would propose that any dual-use technology deployed in space should be heavily documented, regulated, and sanctioned by this neutral governing body in order to ensure compliance and adherence. The body would operate under guidelines written through multilateral agreements involving all space-faring nations, and the guidelines should include an absolute ban on any nuclear weapons in space. This body would compile a list of all documented objects in space, and disseminate this through open-source technology, in order to facilitate transparency and cooperation. The use of kinetic energy weapons should also be regulated and included in the agreement, as the renewed desire to develop kinetic weapons that require deployment from space has created concern amongst the international community (Wang). The fact that existing treaties only prohibit the use of nuclear and other weapons of mass destruction in space may serve as a loophole for those countries that have the financial resources to deploy them. Likewise, this body should regulate the use of directed energy technology, such as lasers and particle beams used for space propulsion, but can also be used for weapons, and decide how this technology can be tracked and verified.

Another issue concerning technology in outer space is the use of ASAT weapons. This technology has been tested by the United States, Russia, China, and most recently, India (Johnson-Freese & Burbach, 138). ASAT weapons have yet to be used for an offensive strike against another state, but they have been used to demonstrate military prowess by destroying their own defunct satellites in order to test ASAT capabilities (Johnson-Freese & Burbach, 138). The destruction of these satellites has raised concern for the orbital debris it causes and the potential damage to other technology already placed in orbit. ("Debris in Brief" 2007) While more space debris will become a larger issue to objects and humans in space, it will also pose a danger to humans on Earth, as space debris often enters the atmosphere through uncontrolled re-entry ("Ares", accessed 02 Feb 2020). The use of ASAT technology should be strictly regulated, if not entirely restricted, under the conditions of a new agreement. The regulations concerning ASAT technology should also address the financial responsibilities of damage done to technology and the potential for costs associated with the clean-up of orbital debris.

The US military space budget has increased by approximately 14 percent from the previous fiscal year to more than 14 billion dollars annually ("FY2020 National" 2019). This increase in military space spending has alarmed countries such as Russia and China, and they have increased their own military budgets for the development of ASAT weapons to target critical US satellites (Kriening). Amongst the various uses for military satellites, intelligence gathering, communications, and navigation are the most critical. The destruction of satellites could cripple military communications and navigation, and the simple threat of destroying the satellite of another state could trigger an offensive strike. This could lead to extensive damage both on Earth and in space. For this reason, the creation of regulations and sanctions regarding the use, or threat of use, of ASAT weapons will be pivotal in the prevention of a war in space.

Outlining the appropriate uses for space, for both governmental and private entities, will be critical in preserving and protecting the sanctity of outer space. Privatization often encourages innovation, which will undoubtedly lead to growth within the space-technology industry. However, the implications of privatized space technology could be disastrous without the proper limitations. Private companies like SpaceX have already begun flying resupply missions to the International Space Station, and they soon will have the ability to bring cargo into space for a significantly reduced price. This could have massive implications on the future of orbital kinetic energy weapons (Wang). Therefore, private entities should be included in all agreements, and the private entity should receive sponsorship from their respective states and approval from the governing body.

Likewise, the removal of orbital debris can be a lucrative activity, and with the further development of technology, it is likely to become a highly commercialized and possibly privately-funded activity. This could be a great solution for the removal of orbital debris, but any use of technology that can move, de-orbit, or destroy objects has the potential to be used for offensive purposes, which can lead to distrust and misuse of technology (“The Implications”). Therefore, I would propose that any private entities entering space for commercial activity involving dual-use technology would be held liable under the state in which they are sanctioned.

Canada has consistently held the position that space should be a peaceful domain to ensure the safe, secure, and sustainable use of space (“Space Issues”). Canada should reaffirm its commitment to the UN Resolution 69/32 on the ‘No first placement of weapons in outer space’ as a confidence-building measure (“No First Weapons”). Additionally, Canada should seek a multi-disciplinary approach that ensures the diversity of the established panel to include a blend of academics, politicians, economists, environmental scientists, and security experts. This will ensure a broad range of knowledge and expertise in implementing an acceptable agreement.

When considering the offensive and dominant position held by the current and previous administrations in the United States, the close alliance between the United States and Canada could be viewed as a hindrance to Canada’s continued peaceful stance on space. However, it could also be used as an opportunity to utilize the alliance and bring the US into a multilateral agreement. Canada is generally known for valuing multilateralism and cooperation, and this reputation can be used to further this purpose. A legally binding multilateral agreement is critical for the future exploration of space, and the agreements and treaties must keep up with the development of technology. Canada can use its position to further disarmament talks and support the neutral territory of space for all of mankind. I believe this

position can be further strengthened through the coordination of an official resolution with a global institution such as the United Nations Security Council, of which three of the major spacefaring nations have permanent veto power ("The Veto").

In conclusion, I believe Canada can benefit from exploring the suggestions above in order to broker a multilateral agreement concerning the safe and appropriate uses of space for all space-faring nations. The implementation of policies regarding dual-use technology, orbital debris, commercial activity, and ASAT weapons will be an important first step in preserving space as a safe domain for all nations.

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Topic: ***As outer space becomes more contested, congested and competitive, the theme of maintaining peace and security while supporting commercialization is becoming more and more prevalent. What are some practical measures (i.e. legislation, regulations, policies, procedures, multilateral agreements, rules of engagement, etc) that Canada could implement to actively promote peace and security in space that go beyond supporting of international treaties, resolutions and TCBMs?***

Alexander J. MacDonald
Master of Strategic Studies, Centre for Military, Security and Strategic Studies
University of Calgary

Alexander MacDonald hails from Mono, Ontario, and holds a Bachelor's of Art from McGill University. After graduating from McGill, Alex undertook a nine-month internship with the Permanent Observer Mission of the Holy See to the United Nations. In his capacity as an advisor, Alex was responsible for following and reporting on the work of the UN Security Council and UN disarmament forums. Alex is currently pursuing a Masters in Strategic Studies at the Centre for Military, Security and Strategic Studies at the University of Calgary. In his free time, Alex volunteers his time to mentorship and leadership programs for young men.

Canada's Contribution to Transparency in the New Frontier

The international community has thus far failed to create consensual and legally-binding rules for the use of outer space beyond those specified in the Outer Space Treaty of 1967.[1] Such rules would reduce ambiguity and help to ensure that the future of space is secure, peaceful and used for the benefit of all. Ambiguity plagues the matters of who is using space and to what ends, as well as the nature of objects in space. This is partly due to current technological limits, but also the lack of voluntary transparency on the part of space actors themselves. The result is uncertainty that causes anxiety, provides avenues for hostility and fuels insecurity. Such ambiguity, in the absence of rules and norms, has led powerful actors and spacefaring nations to declare space "a new operational domain."[2] The current situation, if unchecked, is poised to undermine the great collective dreams of how space can benefit the entire human family.

Canada can decisively act in response to this ambiguity, and contribute to securing this new and ever-expanding frontier for peaceful purposes. Canada was the third nation to begin spacefaring activities, is one of the first members of the Committee on the Peaceful Uses of Outer Space (COPUOS), and a partner in the International Space Station initiative, all of which is undergirded by Canada's advanced and pioneering commercial space industry.[3] Canada has been a leader in space and related technologies, and is well positioned to be a leader in peaceful space security.[4]

Canada can achieve this leadership by taking practical measures domestically, bi-laterally and outside of the formal multilateral instruments to further promote peace and security in space, and in so doing build upon its current international obligations in this arena in pursuit of a peaceful space domain.

In an environment of intense mistrust, benign activities can seem hostile. Thus, transparency and confidence-building measures (TCBMs) are an important bulwark against proliferating potential threats. Yet, when the process of multilateral TCBMs stalls, Canada should shoulder its responsibility as a leading spacefaring nation though unilateral and bi-lateral actions, in addition to taking steps to create the environment for progress.[5]

The Long-Term Sustainability Guidelines developed and adopted by COPUOS could be implemented via legislation to create clear standards for, *inter alia*, sustainable space utilization and pre-launch conjunction assessments.[6] This approach has the benefit of requiring domestic commercial actors to come into compliance with the Guidelines, thereby contributing to the formulation and strengthening of norms related to outer space. Domestically codifying some of these Guidelines – a commitment to, for example, developing Canadian space capabilities in a manner that avoids harm in outer space and to the safety of space operations – would be valuable. Such a commitment would clarify what Canada considers as acceptable behavior and underscore its commitment to meeting legal norms. The Guidelines could be implemented in a piecemeal strategy by topical area all while tailoring them to the Canadian context.

In addition to releasing transparent technical information, Canada should also formulate a comprehensive space doctrine with associated policies so as to provide greater context to its space activities. By providing and adhering to a public space policy, Canada will build the confidence of other space actors – a crucial matter in cases of dual use technology (i.e. co-orbital objects). In the absence of internationally established standards and norms, it is of great value if individual states clearly outline their standards of action, especially in regard to actions that may be easily mistaken as hostile (i.e. approaching another orbiting object). Canada, in disclosing its standards, would make a valuable contribution to the foundation of international norms in this area. This doctrine would, among other things, define what Canada understands to be the weaponization of space, a generally contested concept at present, and what Canada would deem to be a threat or constitute the use of force against one of its space objects (i.e. what activities would contravene the UN Charter and the Outer Space Treaty).[7]

An ongoing destabilizing factor is the development and testing of anti-satellite (ASAT) capabilities.[8] Should Canada ever wish to pursue ASAT capabilities, it should make clear commitments through domestic legislation. Such commitments could follow those formulated and proposed by the United Nations Institute for Disarmament Research (UNIDIR): no debris, low debris and notification.[9] Such legislation, in addition, would clarify how Canada would respond to an ASAT threat or attack, again reducing ambiguity and developing norms.

To further thwart ambiguity in the nature of Canada's space activities, Canada should disclose the payloads of all its launches and make available for inspection any dual-use technology. This could be done unilaterally or arranged through bi-lateral agreements and understandings with the idea of laying the foundation for an international monitoring regime building on the decades old proposal for the International Satellite Monitoring Agency (ISMA).[10]

Canada, moreover, should make domestic efforts to broaden participation in the discussion and formulation of policies for the peaceful use of outer space. Development in space technology is being driven by commercial actors and academia as much as by governments. Private commercial entities exacerbate security concerns through the further development of suspicious dual-use technologies, but

these entities can also advance development of space situational awareness capabilities and thereby support verifying compliance and building trust through a cooperative security arrangement for activity in outer space.[11] It is essential that commercial actors be included in the conversation so they can understand the norms that are being developed, contribute to them, obey them, and develop technology in line with them. To be a leader in the peaceful use of outer space Canada must harness and direct its powerful commercial actors.

By expanding the range of actors involved in space security, there is a higher likelihood for generating meaningful, accurate, and effective solutions to space-security questions. This is also a recognition that space-based security dilemmas in the near future will not strictly be inter-state, but will likely include, or originate from, commercial space actors.[12]

These actions will build trust among space actors by defusing ambiguities in the nature and scope of space operations. While technology is rapidly advancing in this field, it remains difficult to track and monitor objects in space.[13] Thus, it is necessary for states at this point to voluntarily provide information regarding their space activities so as to ensure clarity of intent and action.

These, and related actions, are outlined in the following proposals:

Proposals

1. Canada should make domestic efforts to broaden participation in the discussion and formulation of policy regarding peaceful uses of outer space.
2. Canada should develop and publicly release a space doctrine with associated policies so as to provide greater context and clarity to its space activities.[14]
3. The COPUOS Long Term Sustainability Guidelines should be implemented via legislation.[15]
4. Canada should conclude more bi-lateral framework agreements on cooperation in the exploration and use of outer space for peaceful purposes, mirroring the current agreement between Canada and the US.[16]
5. Bi-laterally, Canada should offer technological aid and capacity building projects to developing countries' space programs to ensure that they have the resources necessary for transparency and compliance with the norms of responsible use.
6. Canada should undertake bi-lateral and multi-lateral advocacy for the establishment of an ISMA.
7. Canada should commit to voluntarily disclosing the contents of its launches (payloads) so as to certify their non-weapon character.
8. Domestic promotion of the linkage between the UN's Sustainable Development Goals (SDGs) and space technology, which will aid norm cultivation and domestic sensitivity to how space is conceptualized and practically used. [17]
9. Foster domestic space defence expertise so as to leverage it when devising policies through the North American Aerospace Defense Command (NORAD) and in conjunction with European partners, through such initiatives as Innovation for Defence Excellence and Security (IDEaS).[18]
10. As a NATO member, Canada should advocate for the development and promulgation of shared commitments for the peaceful use of satellites among NATO members. This would build support for the European Union's draft Code of Conduct for Outer Space Activities (ICoC).[19]
11. Canada should continue to lead in acts of voluntary transparency through multi-lateral institutions. Canada has been one of the few States to report its space activities via an annual report to the Scientific and Technical Subcommittee of COPUOS.[20]

12. The Canadian government should resume its annual voluntary contributions to UNIDIR and specifically support UNIDIR-led conferences on space security, in conjunction with domestic NGOs.[21]

These proposals, though not sweeping, *are* pragmatic and are based on sound technical foundations.[22] Such specific changes can be intensified over time, all the while contributing to the formulation of norms and a clear organizational culture which can be leveraged. These specific steps are drawn from the identification of high priority threats that can be mitigated by incremental steps. Such an approach avoids the now well-defined stumbling blocks of establishing multilateral space security: the promotion of comprehensive agreements despite an absence of international consensus and the pursuit by some Sates of geostrategic goals that extend into outer space.

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[6] A/AC.105/2018/CRP.20.

[7] UN Charter, Article 2 (4).

[8] Weeden and Samson (2019).

[9] UNIDIR (2018).

[10] UNODA (1983). This publication best outlines the genesis of this proposal.

[11] UNIDIR (2019).

[12] Peoples (2011).

[13] Bowen (2014), 49.

[14] Space is sporadically mentioned in Canada's 2017 Defence policy "Strong, Secure, Engaged" but the references do not amount to a comprehensive public space policy.

[15] Canada is already complying with some COPUOS guidelines through the Canadian Remote Sensing Space Systems Act (2005) and its associated Regulations (2007) which make a clear method of disposing of remote sensing products a pre-condition for obtaining a satellite license, and the Canadian Space Agency adoption of the IADC Space Debris Mitigation Guidelines (2012).

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[17] "A New Space Strategy for Canada: exploration, imagination, innovation" (2019) is a good start.

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Topic: To what degree do you believe Intangible Technology Transfer (ITT) plays a role in today's weapons of mass destruction risk and how could governments more effectively seek to mitigate these risks?

John Marshall Palmer
Doctor of Philosophy, International Affairs
Norman Paterson School of International Affairs
Carleton University

J. Marshall Palmer is a Ph.D. student at the Norman Paterson School of International Affairs (NPSIA), at Carleton University. His research focuses on the strategic logic of foreign electoral intervention. He holds a B.Sc. in International Relations from the London School of Economics and Political Science and an M.Phil in International Relations from the University of Oxford. Before joining NPSIA, he worked as a Middle Eastern regional analyst at NATO's Supreme Headquarters Allied Powers Europe, and as a researcher at Oxford Analytica.

Managing the Risk of Intangible Technology Transfer

Introduction

Intangible technology transfer (ITT) refers to the movement of non-physical machinery and knowledge across borders. In the context of the proliferation of Weapons of Mass Destruction (WMD), ITT takes the form of software and code, explicit instructions on how to build weapon systems, and tacit expertise, often contained within the mind of an individual, on executing those instructions. Although existing counter-proliferation regimes already account for ITT, changing global trends, in particular the evolving nature of technology itself, pose new risks. To manage these risks, states and international organisations must adopt a number of new policies and practices.

WMD proliferation depends upon the acquisition and combination of three things: material, capital, and knowledge, with the latter two comprising ITT. Intangible capital takes the form of software and code, as the production (and even delivery) of WMD is increasingly reliant upon digitisation.

[1] These are typically transferred through the cyber domain. Knowledge can take the form of a set of explicit instructions, which can be easily communicated using email, cloud-based services, or even encrypted chat channels. Knowledge can also be tacit, which must be built up over time and is not easily communicable, like learning how to ride a bicycle or play a musical instrument (or, in an example case of WMD, cultivate polio cultures).[2] Tacit knowledge is transferred through the movement of the expert actually in possession of that knowledge.

ITT is not essential for WMD proliferation but without it countries must rely on the comparatively costly, time-consuming, and detectable method of indigenous knowledge and technology development. Because ITT offers an advantageous 'jump ahead', states always seek to acquire it. The Soviet nuclear program relied upon explicit knowledge stolen from the United States, although without related tacit knowledge, the program was delayed by four years.[3] Pakistan's nuclear program was famously reliant upon the work of A.Q. Khan, who built up his expertise while studying in the Netherlands.[4] China's development of carbon fibre technologies—needed to build WMD systems—has similarly depended upon transfers of explicit and tacit knowledges.[5]

The challenge of ITT

Methods of controlling ITT have historically been embedded within a network of anti-proliferation treaties and conventions, the Wassenaar Arrangement, UN-directed embargos, as well as national and regional (in the case of the EU) export control policies. These efforts have predominantly taken the form of export controls but have not kept pace with new methods of ITT nor the increased ease of access to explicit and tacit knowledge.

The first challenge is that existing regulatory regimes sit in disharmony. Even in the EU, member states disagree on the precise meanings of 'required', 'production', and 'development' of specific controlled software.[6] This creates vulnerabilities in existing counter-proliferation initiatives and hampers the development of new policies.

Second, unlike the transfer of physical machinery or export of sensitive material, technological expertise in the cyber domain, especially in the era of encryption, is difficult to track. The rise of cloud computing exacerbates this issue as the location of where an email is sent, or where an upload is made may be in a different jurisdiction from the location of the hosting server.[7] Relatedly, intangible technology stored on cyber networks is vulnerable to attack and theft by rogue states or terrorist groups.

Third, much of intangible technology is dual-use in nature. This is especially true with regards to the publication of legitimate scientific research. In 2011, for example, the Dutch government forced a virology team to first obtain an export licence before publishing research on how the H5N1 virus (avian influenza) could be transferred via aerosol. Although the team's research was clearly in the interests of public health, the concern was that the information and methods contained in the team's publication could be used by bioterrorists or rogue states seeking to weaponise the flu.[8]

Finally, non-cyber ITT can still be acquired inconspicuously. Although the movement of high-profile experts can be easier to track, there is a risk that researchers-in-training might later be recruited into weapons development programs. Because there are more foreign students studying in the world today than at any time in the past, there is a wider pool from which rogue state and terrorist groups can recruit potential talent.[9] There is already evidence that states are using their diaspora populations for similar purposes, including in Canada.[10] There is lastly the ever-present risk posed by the collapse of states with developed weapons programs. Were this to happen to states like Pakistan or North Korea, the expertise contained within them could be internationally diffused.

Risk mitigation strategies

Underlying these challenges is a 'weakest link' problem, relating to international regulation. Since any nefarious ITT makes every state worse off, the strength of anti-proliferation efforts is determined by the weakest of those efforts.[11] Today, former Soviet states and Pakistan often constitute this weakest link. Insofar as policymakers are concerned, any counter-proliferation solution must be pursued as a multilateral and global effort, in order to maximise its efficacy in strong and weak states alike.

The first priority is for governments to standardise their interpretations of existing counter-proliferation rules. Moving forward is not possible without agreement on the underlying obligations of existing arrangements. Existing treaties and arrangements will need to be updated and clarified.

In the cyber domain, governments should invest in the development of their own cyber defences. It is true that encryption can make illicit transfers harder to detect but this cost is offset by the same protection encryption affords to benign actors handling sensitive intangible technology. Governments must therefore make the attainment of export licences of sensitive goods (the production of which is connected to intangible technology) dependent upon the use of encryption. Governments will also need to resolve ambiguity regarding jurisdictional responsibility in the cyber realm—a need which goes beyond just ITT. In May 2018, the UK Attorney General Jeremy Wright outlined his government's views on how this might be done.[12] Canada and other governments should follow suit.

Regarding dual-use academic research, governments must treat the principle of academic freedom as sacrosanct—a principle which, for example, allows governments to stay ahead of devastating pandemics or to develop cutting-edge technology. Governments should however develop layered defences. At the outset, any academic program that conducts research into dangerous chemical, biological, and nuclear material must first acquire a licence. Second, governments need to conduct outreach and encourage the scientific community to self-regulate on the handling of dual-use research.

Tackling the transfer of tacit knowledge contained within the mind of an expert will require governments to introduce reliability checks for anyone studying dual-use subjects. This will need to include introducing visa-vetting for foreigners, a move already undertaken in the United Kingdom.[13] To paraphrase Ronald Reagan, the guiding principles for these checks should be to 'trust but verify'. On the question of latent risks posed by fragile states, governments should develop contingency plans to capture the 'free agents' that might emerge in the aftermath of state collapse. Much as the United States' Operation Paperclip recruited some 1,600 German scientists following the Second World War, nations today must be prepared to do the same.

Canada's role and conclusion

Like all forms of risk, the risk posed by ITT to proliferation is ultimately the combination of probability and outcome. As history has shown, the outcome of ITT is a dangerously shortened timeline of weapons development. Canada can target the probability of this outcome by attacking all aspects of the proliferation chain—material, capital, and knowledge. Regarding ITT, Canada must adapt to developments in the cyber domain and new vulnerabilities in access to explicit and tacit knowledge.

Canada can assist in this global effort by promoting two existing national programs. The 2015 Human Pathogens and Toxins Act Licensing Program made it a requirement for those handling or researching dangerous biological materials to have first acquired a licence. Second, the "Safeguarding Science" initiative conducts outreach with universities and other research institutions on issues surrounding research and proliferation.

But more must be done. Canada does not have reliability screening for those conducting advanced dual-use research. Such a policy should be introduced, including a visa-vetting system as much focused on bringing talented people in as keeping risky actors out. Given a wider need to retain talent and intellectual property in Canada, this revision to the visa system should be part of larger strategy aimed at boosting economic competitiveness.[14]

Canada must also do more to punish serial violators of proliferation. The Area Control List, which establishes which export destinations require export permits, should be updated to include Syria—which is a serial violator of the Chemical Warfare Convention.

States have always had to manage ITT, since at least the days of Charlemagne who dealt with the issue by placing limits on the movements of sword-producing blacksmiths. History is clear. Counterproliferation efforts are most successful when they adapt to changing circumstances and when they are truly multilateral in nature. As this age-old threat continues to evolve, Canada and the world must work together to stay one step ahead of those who seek to acquire or develop WMD. [15]

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Topic: The Brussels Summit Declaration Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Brussels 11-12 July 2018 stated "The Alliance reaffirms its resolve to […] take further practical steps and effective measures to create the conditions for further nuclear disarmament negotiations and the ultimate goal of a world without nuclear weapons […] in an ever more effective and verifiable way that promotes international stability, and is based on the principle of undiminished security for all." What practical steps could NATO Allies consider taking to advance these goals are such actions best pursued within or outside of NATO as an institution?

Laura Pottier
Master's of Arts, International Relations
Norman Paterson School of International Affairs
Carleton University

Laura Pottier holds a Bachelor of Arts (Honours) degree in History and Political Science from Queen's University. She is currently a Master's candidate completing the final semester of a graduate degree in International Affairs, with a field designation in Project Management and Humanitarian Assistance at the Norman Paterson School of International Affairs (NPSIA), Carleton University. Her research interests are centred on human security and gender, two areas she is passionate about. She has worked previously as a Research and Advocacy Intern at Mines Action Canada, researching humanitarian effects of cluster munitions on civilian populations, as well as a Bilateral Relations Officer at Global Affairs Canada in the Asia Pacific Division. She currently works as a Junior Research Analyst on the Gender Equality Research Team at the Department for Women and Gender Equality. In September 2020, she will commence an internship at NATO Headquarters at the Arms Control and Disarmament Centre (ACDC), where she will work on non-proliferation policy for weapons of mass destruction.

Engagement, Promotion and Foresight:

A Strategic Plan to Address the Changing Nuclear Landscape

Since the conclusion of the Cold War, significant gains have been made to advance nuclear non-proliferation and disarmament efforts globally. The number of strategic nuclear warheads in the world has declined from the 1986 peak of over 70,000 down to an estimated 13,890.[1] Such gains can be attributed in large part to the establishment of an international arms control treaty regime, which has served to not only prevent the spread of nuclear weapons, but also promote co-operation in the peaceful uses of nuclear energy and provide trusted and verifiable means to further nuclear disarmament. In recent years, however, these post-Cold War gains have come under increasing threat, especially with the dissolution of key arms control treaties foundational to international disarmament efforts.

In August 2019, U.S. Secretary of State Mike Pompeo announced the United States formal withdrawal from the Intermediate-Range Nuclear Forces Treaty (INF).[2] Since then, the United States has tested ground-launched ballistic missiles previously prohibited under the INF treaty and publicly announced U.S. intentions to continue to do so.[3] In May 2018, President Trump announced U.S. withdrawal from the JCPOA and signed a presidential memorandum to institute the, "Highest level" of economic sanctions on Iran.[4] Iran has since exceeded the stockpile limit of low-enriched uranium outlined in the JCPOA and breached the 2.67% enrichment level. Several other arms control treaties have come under fire in recent years as well, NPT notwithstanding. In addition, the Comprehensive Nuclear-Test-Ban Treaty is yet to

come into force, with no significant progress being made at the latest CTBT Preparatory Commission to accomplish this.

International actors and key institutions central to disarmament and nuclear non-proliferation efforts, NATO in particular, have responded in turn by restating their commitment to the non-proliferation and disarmament of weapons of mass destruction. (WMDs). The likes of which, pose a catastrophic risk to the peace and stability of the world as we know it. At the meeting of the North Atlantic Council in Brussels 11-12 July 2018, the Brussels Summit Declaration Issued by the Heads of State and Government stated that, "The Alliance reaffirms its resolve to […] take further practical steps and effective measures to create the conditions for further nuclear disarmament negations and the ultimate goal of a world without nuclear weapons […] in an ever more effective and verifiable way that promotes international stability, and is based on the principle of undiminished security for all."[5]

In this paper, I will outline some of the practical steps, framed around three objective markers, that NATO member countries can employ to work towards achieving the Brussels Summit Declaration aims stated above. These three objective areas to increase and advance global disarmament and nuclear non-proliferation efforts include: (1) Engagement; uphold and protect the arms control treaty framework and increase efforts to incorporate China within it. (2) Promotion; highlight the importance and effectiveness of NATO as a leader in disarmament and non-proliferation efforts. (3) Foresight; Proactively address emerging technologies and threats to the proliferation landscape. Within each I will outline the role of NATO, namely whether or not the collective defence organization is the best method in which to pursue the stated course of action.

Engagement

The importance of arms control treaties in international non-proliferation efforts cannot be understated. They are not only important in establishing norms around WMDs, but also provide a legally binding framework for containment and elimination of nuclear weapons with mechanisms for verification, monitoring, and peaceful dialogue. Upholding and protecting the existing arms control treaty regime that is currently under threat should be the priority of NATO Allies, namely through engaging with the United States to achieve an extension of the Strategic Arms Reduction Treaty (New START).

The United States and Russia still account for over 90 percent of existing nuclear stockpiles.[6] Over half of the estimated 13,475 existing nuclear warheads are deployed on missiles or at bases with operational launchers present. New START remains the only arms control treaty that verifiably caps the two nations' strategic arsenals. Under the agreement, the number of Russian and U.S. deployed strategic warheads for each side are limited to 1,550 and deployed strategic bombers and missiles are capped at 700. The verification regime that accompanies the treaty is a major stabilizing force and prevents unconstrained nuclear competition between the two on the international stage.

The treaty, set to expire in February 2021, can be extended for up to five years through mutual agreement between both Presidents of the United States and Russia without further approval by the U.S. Senate or Russian Duma.[7] The failure to extend New START would eliminate verifiable, legally binding limits on the world's two largest nuclear arsenals for the first time since 1972 and should be avoided at all costs. Russia has already signaled its willingness for a five-year extension. The Trump administration, however, has characterized the treaty as "flawed" and expressed uncertainty in U.S. willingness for extension.[8] As such, significant pressure needs to be directed at the United States for an extension on behalf of NATO and its allies.

The importance of gaining an extension to New START requires a hybrid approach. NATO writ large should lean on the U.S. in an effort to convince the Trump administration of the consequences of a failure to extend. The argument that continuation of the agreement is not only of international interest, but in the domestic interests of the United States as well needs to be made to the US in a more forceful manner.

The Meetings of the North Atlantic Council at the level of Defence Ministers in February 2020 and the 2020 NPT Review Conference in New York could provide particularly useful forums in which to do this.

Additional pressure should also be applied by utilising bilateral relationships with the United States. Canada in particular would be well equipped to act as an engaging force for a New START extension given the unique and important nature of the Canada-U.S. relationship. Canada is a middle power that is particularly adept at exercising its soft power to advance international peace efforts. It would be a natural choice to take a leading role in this endeavour. Ongoing efforts should be made by the Government of Canada, in addition to the development of a strategy for the 2020 G7 Summit at Camp David on the subject.

In addition to increasing engagement with the U.S. for an extension of New START, efforts need to be taken to bring China into a future arms control agreement. In the immediate, this approach would be best pursued bilaterally through the United States, given the tenuous NATO-China relationship. Also, any non-proliferation engagement with China will realistically have to involve the U.S. substantially. Therefore, direct bilateral engagement between the two would make the most sense.

However, moving forward NATO needs to recognize the reality of the current strategic landscape and begin developing an engagement plan for the institution in regard to China. Jens Stoltenberg among many others have voiced the need to address the implications of China's rising military power.[9] The formation of a NATO-China Council could be a possibility for the establishment of a forum for transparency, consultation, consensus-building, and cooperation. Whether or not China is receptive to engage with NATO at the moment, the institution needs to begin engagement on the realities and implications of China in relation to the disarmament and non-proliferation agenda.

Promotion

In addition to depending engagement, NATO and the member countries that comprise it need to do a better job of highlighting both the important work that NATO does to advance global non-proliferation efforts and the threat that nuclear weapons pose to global security. Disarmament and non-proliferation efforts are best pursued through institutions that work within and strengthen the rules-based international order. Establishing trust and accountability are paramount to advancing arms control efforts, and NATO is an institution that can help to provide both. It is important for NATO members and allies to reaffirm their commitments to the institution and support it as the main mechanism in which non-proliferation and disarmament efforts are pursued.

Foresight

Lastly, both NATO and its member states individually need to proactively invest resources into the research of emerging technologies, to better understand and adapt to the changing nuclear threat landscape.

Perhaps the most significant of these emerging threats is the potential introduction of fully autonomous lethal weapon systems. Human rights watch has noted that precursors to lethal autonomous weapon systems (LAWS) are in the process of being developed in China, Israel, S. Korea, Russia, the U.K and the U.S.[10] The UN, under the CCW, has moved towards drafting a treaty to ban LAWS, but no international regulations addressing the emerging technology have been instituted as of yet. Efforts to address LAWS would be best pursued through the United Nations and as such, national governments should engage with the UN to advance a regulatory framework to address these emerging weapon systems.

Engagement with civil society to advance LAWS efforts should also be incorporated into national strategies. There is a strong precedent of this being affective. For instance, the *International Coalition to*

Ban Landmines (ICBL) played an important role in the creation and ratification of the Mine Ban Treaty.[11] Government cooperation with the *Campaign to Stop Killer Robots*, a global coalition of 140 international, regional, and national non-governmental organizations in 61 countries that has been pre-emptively working to ban LAWs for almost a decade, would be a natural place to start.[12] Cooperation with private sector tech companies should also be incorporated into national strategies to address LAWS, as well as within strategies for cybersecurity preparedness.

Another emerging threat that needs to be addressed within and outside of NATO is that of hypersonic weapons. China, Russia, and the U.S. have tested hypersonic weapons of various types.[13] From an arms control perspective, the deployment of hypersonic weapons raises a host of additional concerns for international peace and security. Further research should be done by international institutions and national governments to understand the potential impacts of these weapons. An international moratorium on the flight tests of hypersonic weapons could also be pursued as an option until the effects of such weapons are fully known.

Conclusion

In conclusion, more substantial efforts need to be taken both within NATO and outside of it to prevent irreparable rollbacks of nuclear non-proliferation and disarmament gains. In order to do so, more direct pressure needs to be exercised against states to protect and enlarge the arms control treaty regime. Ensuring an extension of New START will be integral to this. Additionally, promoting NATO and the international rules-based order will help to establish a trustworthy forum for engagement. And lastly, proactively addressing emerging technologies and threats to the disarmament landscape will be necessary in order to ensure, "the conditions for further nuclear disarmament…and a world without nuclear weapons" vision vocalised in the Brussels Summit Declaration.

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Expert Review Panel

Jean-Christophe Boucher is an Assistant Professor at the School of Public Policy and at the department of political science at the University of Calgary. His is currently a director of research in civil-military relations at the Canadian Defence and Security Network funded by the Social Science and Humanities Research Council. A fellow at the Canadian Global Affairs Institute; a research Fellow at the Centre for the Study of Security and Development at Dalhousie University; Senior Fellow at the Centre interuniversitaire de recherche sur les relations internationales du Canada et du Québec. He holds a BA in History from the University of Ottawa, a MA in Philosophy from the Université de Montréal and a PhD in Political Science from Université Laval. He specializes in international relations, with an emphasis on Canadian foreign and defence policies, international security, and methodology.

Nancy Teeple is a postdoctoral fellow at the DND/MINDS funded North American and Arctic Defence and Security Network (NAADSN) and an adjunct assistant professor and research associate at the Department of Political Science and Economics at the Royal Military College of Canada. Nancy recently held the 2019-2020 Fulbright Canada Research Chair in Peace and War Studies at Norwich University in Vermont. She specializes in nuclear strategy and deterrence, missile defence, arms control, and Arctic security. Nancy was a contributing author to the Simons Foundation 2018 Report "Repairing the US-NATO-Russia Relationship and Reducing the Risks of the Use of Nuclear Weapons." She was also a recipient of the Simons Foundation Graduate Research Award for Disarmament, Arms Control and Non-Proliferation in 2013.

Ekaterina Piskunova is a Professor in the Political Science department at Université de Montréal.

Annex I

2019-2020

GRADUATE RESEARCH AWARDS

for Disarmament, Arms Control and Non-Proliferation

$5,000

Competition Details

Graduate Research Awards for Disarmament, Arms Control and Non-Proliferation are offered by The Simons Foundation Canada and the International Security Research and Outreach Programme (ISROP) of Global Affairs Canada (GAC).

A total of **four awards of CAD $5,000** are available to Canadian Master's and/or Doctoral candidates to support the independent research and writing of an academic paper responding to a specific Non-Proliferation, Arms Control and Disarmament (NACD) topic. Awards also include domestic travel support to Ottawa where successful candidates will present their completed papers during a special event at Global Affairs Canada Headquarters in March 2020.

Deadline for applications:	**3 February 2020**
Selection of four award recipients:	**21 February 2020**
Presentations at GAC Headquarters in Ottawa:	**25 March 2020**

HOW TO APPLY:

Complete applications should be sent to Elaine Hynes at The Simons Foundation by email to: **ehynes@thesimonsfoundation.ca** by the close of business (PST) on 3 February 2020.

Your application must include:

- Your resume, including proof of citizenship status.
- A complete official transcript of your grades (including undergrad). Electronic copies of official transcripts are acceptable.
- An academic paper (1,500 words, MLA format) responding to one of the specific Non-Proliferation, Arms Control and Disarmament topics shown below.

ELIGIBILITY:

The competition is open to Canadian citizens and Canadian permanent residents/landed immigrants currently enrolled in a graduate programme. Graduate students studying outside Canada are eligible to apply but please note that funding to cover the cost of successful applicants' travel to Ottawa for the event at Global Affairs Canada in March is limited to domestic travel within Canada (or the equivalent).

In order to expand the community of Canadian scholars working on non-proliferation, arms control and disarmament (NACD) issues, employees of Global Affairs Canada, and previous recipients of a Graduate Research Award are not eligible.

SELECTION PROCESS:

Applications will be reviewed by an Expert Review Panel made up of three experts and academics working in this field who will recommend four award winners for final approval by representatives of The Simons Foundation and ISROP. Successful candidates will be notified on 17 February 2020.

PRESENTATIONS AT GLOBAL AFFAIRS CANADA HEADQUARTERS:

Award winners will present their papers at a special event hosted by Global Affairs Canada at the Lester B. Pearson building in Ottawa in March 2020, and will be asked to produce a PowerPoint deck for their presentation. The cash awards will be issued at the GRA event in Ottawa and a report, including the papers presented, will be published online by The Simons Foundation. ***Please note that attendance at the GRA event in Ottawa is a mandatory requirement of the award.*** Approved domestic travel, accommodation and meal expenses will be provided by The Simons Foundation.

TOPICS for 2019-2020

Master's and Doctoral candidates may choose to address one of the following subjects:

1. To what degree do you believe Intangible Technology Transfer (ITT) plays a role in today's weapons of mass destruction risk and how could governments more effectively seek to mitigate these risks?

2. In light of the pervasive threat of nuclear terrorism and the corresponding need for strong nuclear security, how can states make sure that nuclear security is enhanced while also ensuring that heightened security doesn't stand as a barrier to States seeking access to peaceful nuclear energy and technology?

3. In 2018, the United Nations launched Youth 2030: Working with and for Young People to support the empowerment, engagement and participation of young people. Priority five of the strategy focuses on supporting young people as catalysts for peace and security. How can Canada engage to further increase and empower youth participation in the non-proliferation, arms control, disarmament, and/or outer space policy-making process?

4. The Brussels Summit Declaration Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Brussels 11-12 July 2018 stated "The Alliance reaffirms its resolve to […] take further practical steps and effective measures to create the conditions for further nuclear disarmament negotiations and the ultimate goal of a world without nuclear weapons […] in an ever more effective and verifiable way that promotes international stability, and is based on the principle of undiminished security for all." What practical steps could NATO Allies consider taking to advance these goals are such actions best pursued within or outside of NATO as an institution?

5. As outer space becomes more contested, congested and competitive, the theme of maintaining peace and security while supporting commercialization is becoming more and more prevalent. What are some practical measures (i.e. legislation, regulations, policies, procedures, multilateral agreements, rules of engagement, etc) that Canada could implement to actively promote peace and security in space that go beyond supporting of international treaties, resolutions and TCBMs?

For more information, please contact Elaine Hynes at The Simons Foundation by email to ehynes@thesimonsfoundation.ca or by telephone at 778-782-7779.

The primary objective of the Graduate Research Awards is to enhance Canadian graduate level scholarship on disarmament, arms control and non-proliferation issues.

BOURSES DE RECHERCHE DES CYCLES SUPÉRIEURS 2019-2020 *pour le désarmement, le contrôle des armements et la non-prolifération*

5 000 $

Renseignements détaillés concernant le concours

Les bourses de recherche des cycles supérieurs pour le désarmement, le contrôle des armements et la non-prolifération sont offertes par la Simons Foundation et le Programme de recherche et d'information dans le domaine de la sécurité internationale (PRISI) d'Affaires mondiales Canada (AMC).

En tout, **quatre bourses de 5 000 $ CA** seront remises à des étudiants canadiens à la maîtrise ou au doctorat afin d'appuyer les recherches indépendantes et la rédaction d'un essai universitaire portant sur un sujet précis lié à la non-prolifération, au contrôle des armements et au désarmement. Les bourses prévoient également un soutien pour un voyage à Ottawa au cours duquel les lauréats présenteront leur travail achevé lors d'un événement spécial à Affaires mondiales Canada qui se tiendra en mars 2020.

Date limite de présentation des candidatures :	**3 février 2020**
Sélection des quatre boursiers :	**21 février 2020**
Présentations à l'administration centrale d'AMC à Ottawa :	**25 mars 2020**

COMMENT PRÉSENTER SA CANDIDATURE

Les demandes complètes doivent être acheminées par courriel à Elaine Hynes de la Simons Foundation à **ehynes@thesimonsfoundation.ca** avant la fermeture des bureaux (HNP) le 3 février 2020.

Votre demande doit comprendre ce qui suit :

- Votre curriculum vitæ, y compris une preuve de citoyenneté.
- Un relevé de notes complet et officiel (des copies électroniques des relevés officiels sont acceptées).
- Un essai universitaire (1 500 mots, format MLA) portant sur l'un des sujets proposés ci-dessous concernant la non-prolifération, le contrôle des armements et le désarmement.

ADMISSIBILITÉ

Ce concours est ouvert aux citoyens canadiens et aux résidents permanents du Canada actuellement inscrits à un programme d'études supérieures. Les étudiants de cycle supérieur qui poursuivent leurs études à l'étranger peuvent présenter une demande, mais les frais couverts pour le voyage à Ottawa

permettant aux lauréats de prendre part à l'événement organisé par Affaires mondiales Canada en mars seront limités aux déplacements à l'intérieur du Canada (ou l'équivalent).

Afin d'accroître le nombre de chercheurs canadiens travaillant dans le domaine de la non-prolifération, du contrôle des armements et du désarmement, les employés d'Affaires mondiales Canada et les personnes ayant déjà obtenu la Bourse de recherche des cycles supérieurs ne sont pas admissibles.

PROCESSUS DE SÉLECTION

Un groupe d'experts formé de trois spécialistes et universitaires travaillant dans le domaine examinera les demandes et recommandera quatre candidats. Des représentants de la Simons Foundation et du PRISI devront approuver les recommandations. Les candidats sélectionnés seront informés le 17 février 2020.

PRÉSENTATIONS À L'ADMINISTRATION CENTRALE D'AFFAIRES MONDIALES CANADA

Les lauréats présenteront leur travail lors d'un événement spécial organisé par Affaires mondiales Canada à l'édifice Lester B. Pearson à Ottawa en mars 2020. Ils seront invités à préparer une présentation en format PowerPoint pour leur exposé. Les bourses seront remises lors de l'événement à Ottawa et un rapport comprenant notamment les travaux présentés sera publié en ligne par la Simons Foundation. ***La présence à l'événement visant à décerner les bourses de recherche des cycles supérieurs qui se tiendra à Ottawa est obligatoire.*** Les frais de déplacements au Canada, ainsi que les coûts pour l'hébergement et les repas qui ont été approuvés seront remboursés par la Simons Foundation.

SUJETS pour 2019-2020

Les candidats à la maîtrise et au doctorat peuvent choisir de se pencher sur l'un des sujets suivants :

6. Dans quelle mesure croyez-vous que le transfert de technologies incorporelles (TTI) joue un rôle dans le risque lié aux armes de destruction massive dans le monde d'aujourd'hui, et que pourraient faire les gouvernements pour atténuer ces risques ?

7. À la lumière de la menace généralisée du terrorisme nucléaire et du besoin consécutif d'une sécurité nucléaire robuste, comment les États peuvent-ils améliorer leur sécurité nucléaire sans que ces mesures n'entravent l'accès des États à l'énergie et à la technologie nucléaires à des fins pacifiques ?

8. En 2018, les Nations unies ont lancé Jeunesse 2030 : Travailler avec et pour les jeunes, pour appuyer l'autonomisation, l'engagement et la participation des jeunes. La priorité numéro cinq de la stratégie vise à encourager les jeunes à devenir des acteurs de la paix et de la sécurité. Comment le Canada peut-il œuvrer à accroître davantage la participation des jeunes dans les processus de non-prolifération, de contrôle des armes, de désarmement et/ou d'élaboration de politiques relatives à l'espace ?

9. Dans le cadre de la Déclaration du sommet de Bruxelles publiée par les chefs d'État et de gouvernement participant à la réunion du Conseil de l'Atlantique Nord tenue à Bruxelles les 11 et 12 juillet 2018, « l'Alliance réaffirme sa détermination à […] prendre de nouvelles mesures

concrètes et efficaces permettant de créer les conditions propices à de nouvelles négociations sur le désarmement nucléaire et à la réalisation de l'objectif ultime d'un monde sans armes nucléaires, […] d'une manière toujours plus efficace et vérifiable qui favorise la stabilité internationale et se fonde sur le principe d'une sécurité non diminuée pour tous ». Quelles mesures concrètes les membres de l'OTAN pourraient-ils envisager pour accomplir ces objectifs, et vaudrait-il mieux prendre ces mesures sous le cadre institutionnel de l'OTAN ou en dehors de ce cadre ?

10. L'espace est un milieu de plus en plus contesté, engorgé et compétitif, et une importance croissante est accordée au maintien de la paix et de la sécurité dans l'espace tout en appuyant son utilisation commerciale. Quelles sont les mesures concrètes (lois, règlements, politiques, procédures, ententes multilatérales, règles d'engagement, etc.) que le Canada pourrait appliquer pour promouvoir la paix et la sécurité dans l'espace, au-delà de son appui à des résolutions et traités internationaux et à des mesures visant à accroître la transparence et la confiance ?

Pour obtenir de plus amples renseignements, veuillez communiquer avec Elaine Hynes de la Simons Foundation par courriel à ehynes@thesimonsfoundation.ca ou par téléphone au 778-782-7779.

Les bourses de recherche des cycles supérieurs visent d'abord et avant tout à accroître le financement accordé au cycle supérieur pour les recherches en matière de désarmement, de contrôle des armements et de non-prolifération.